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(71) Applicant: SYMBIOSIS CORPORATION [US/US]; 8600 N.W. 41st Street, Miami, FL 33166 (US).

(72) Inventor: WHITTIER, John, R.; 12051 S.W. 118th Street, Miami, FL 33186 (US).

(74) Agent: McCURDY, Barbara, C.; Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., Suite 700, 1300 I Street, N.W., Washington, DC 20005-3315 (US).

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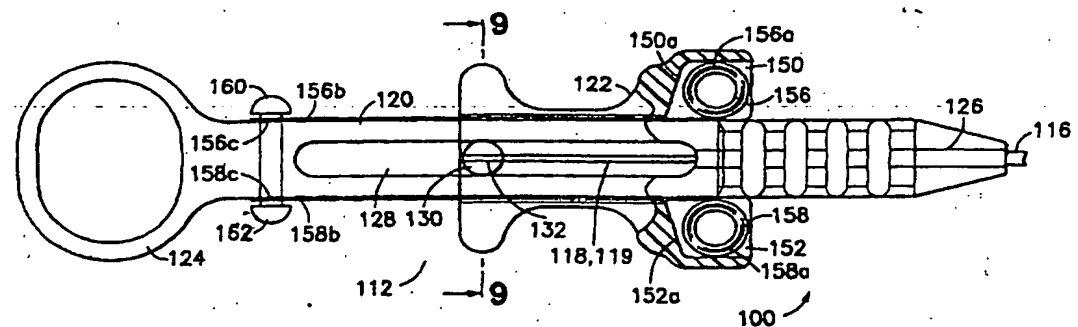
With international search report.  
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

特 許 願 望

引くことも一本の操作ワイヤと他方の  
操作ワイヤに対して変位させる手段と、  
前記始動手段がジョーを閉じる方向に  
一定の力を作用する引くことも一本の  
ワイヤを言っている。

カフを常に閉じる様にし、スプールがどの位  
置であつても常に一定の力を閉じる方向にかけ  
つづける生検鉗子の提供。

(54) Title: ENDOSCOPIC BIOPSY FORCEPS INSTRUMENT HAVING A CONSTANT FORCE SPRING BIASING THE JAWS CLOSED



(57) Abstract

A biopsy forceps instrument (100) includes a flexible coil (116) having one or more pull wires (118, 119) extending therethrough, a clevis (34) coupled to the distal end of the coil, a pair of forceps jaws mounted in the clevis (34) coupled to the distal end of the pull wires, and a proximal handle coupled to the proximal ends of the coil and the pull wires (118, 119). The handle includes a slotted shaft (20), and a displaceable spool (22) having a cross member which extends through the slot (28). The shaft (20) is coupled to the coil, and the cross member is coupled to the pull wires. According to the invention at least one constant force spring is provided between the shaft and the spool, and biases the spool in the proximal direction in order to maintain the jaws in a closed position.

## Claims:

1. An endoscopic biopsy forceps instrument comprising:
- a) a flexible coil having a proximal and a distal end;
  - b) at least one control wire having a proximal and a distal end and extending through said flexible coil;
  - c) actuation means coupled to said proximal end of said flexible coil and said proximal end of said at least one control wire for displacing one of said flexible coil and said at least one control wire relative to the other; and
  - d) a jaw assembly including a pair of forceps jaws, said jaw assembly being coupled to said distal ends of said coil and said control wire such that said jaws are movable from an open position to a closed position, wherein
- said actuation means further includes at least one constant force spring which biases said jaws to said closed position.

- ~~2.~~ An endoscopic biopsy forceps instrument according to claim 1, wherein:

said at least one constant force spring is a wound spiral having a free end.

- ~~3.~~ An endoscopic biopsy forceps instrument according to claim 2, wherein:

said actuation means includes a central shaft and a displaceable spool, one of said shaft and spool being coupled to said proximal end of said flexible coil and the other of said shaft and spool being coupled to said proximal end of said at least one control wire,

said free end of said constant force spring being coupled to one of said shaft and spool and said wound spiral being rotatably coupled to the other of said shaft and spool.

- ~~4.~~ An endoscopic biopsy forceps instrument according to claim 3, wherein:

said free end is coupled to said shaft and said spool has a spring well in which said wound spiral is rotatably disposed.

~~5.~~ An endoscopic biopsy forceps instrument according to claim 4, wherein:

said spring well is disposed at a distal portion of said spool.

~~6.~~ An endoscopic biopsy forceps instrument according to claim 5, wherein:

said spring well has an inclined proximal surface.

~~7.~~ An endoscopic biopsy forceps instrument according to claim 5, wherein:

said spool has an interior groove through which said spring passes.

~~8.~~ An endoscopic biopsy forceps instrument according to claim 4, wherein:

said spring well is disposed at a proximal portion of said spool.

~~9.~~ An endoscopic biopsy forceps instrument according to claim 8, wherein:

said spring well has an inclined proximal surface.

~~10.~~ An endoscopic biopsy forceps instrument according to claim 3, wherein:

said free end is coupled to said spool and said shaft has a spring well in which said wound spiral is rotatably disposed.

~~11.~~ An endoscopic biopsy forceps instrument according to claim 10, wherein:

said spring well has an inclined distal surface.

~~12.~~ An endoscopic biopsy forceps instrument according to claim 10, wherein:

said shaft has a central slot, said spool has a cross member which passes through said central slot, and said free end is coupled to said cross member.

- ~~13.~~ An endoscopic biopsy forceps instrument according to claim 3, wherein:

said shaft has a central slot, said spool has a cross member which passes through said central slot, said free end is coupled to said shaft and said wound spiral is rotatably disposed on said cross member.

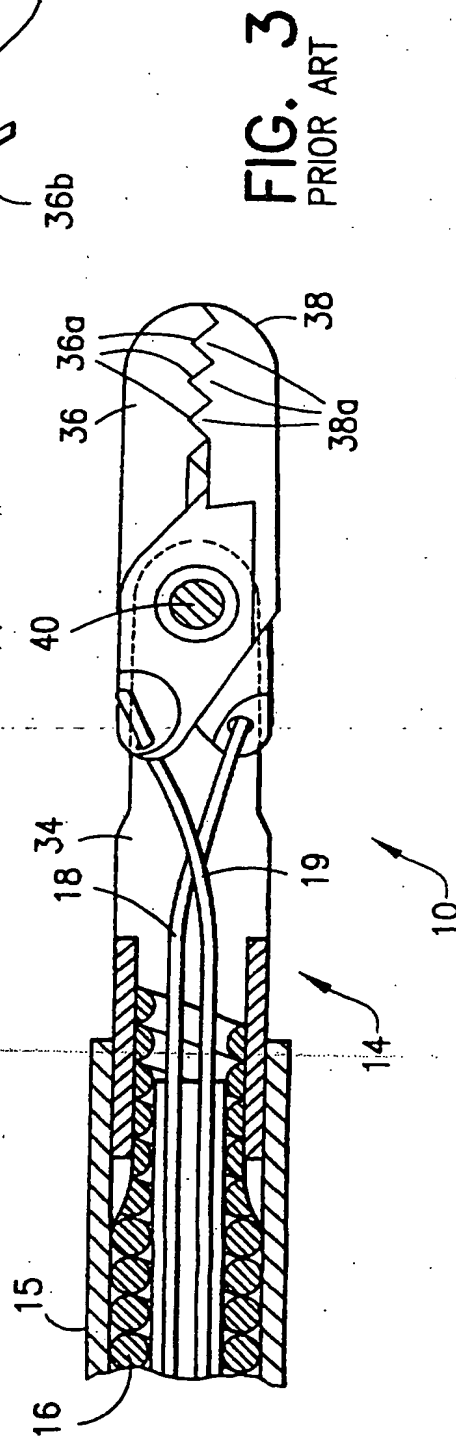
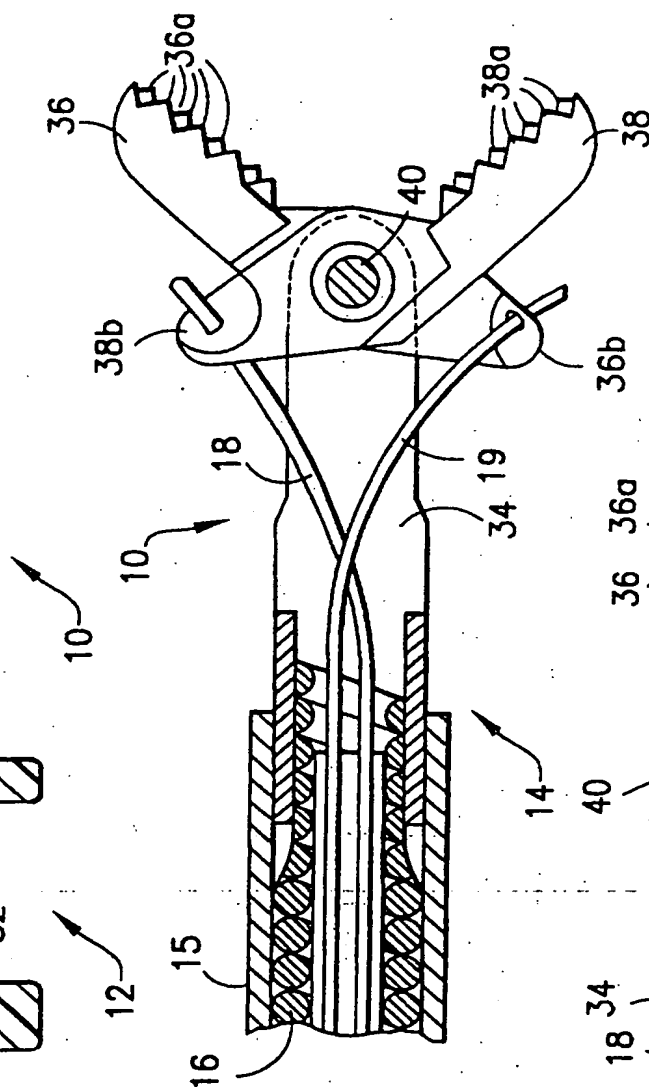
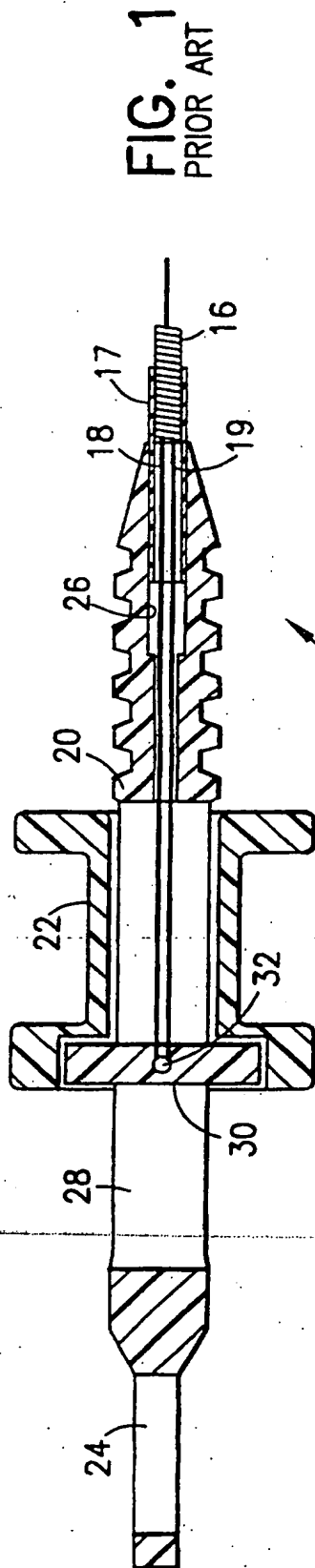
- ~~14.~~ An endoscopic biopsy forceps instrument according to claim 1, wherein:

said at least one constant force spring comprises first and second constant force springs.

- ~~15.~~ An endoscopic biopsy forceps instrument according to claim 14, wherein:

said first and second constant force springs each exert a force of approximately one half pound.

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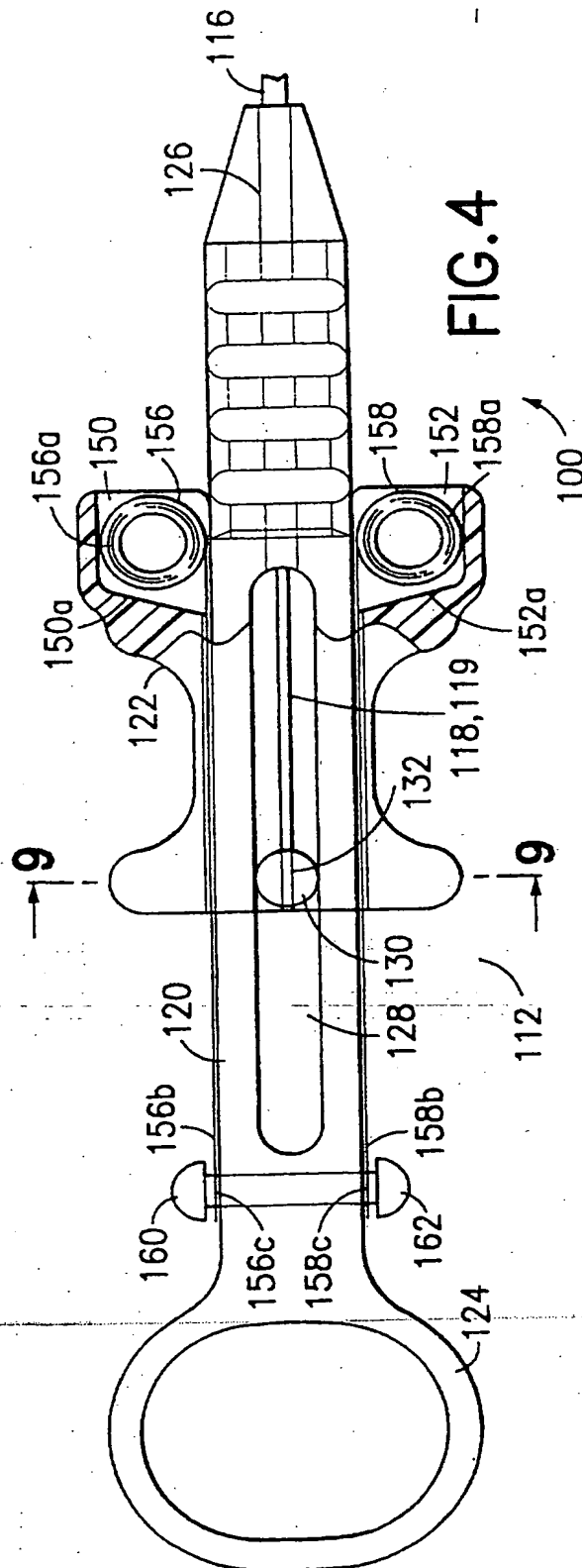


FIG. 4

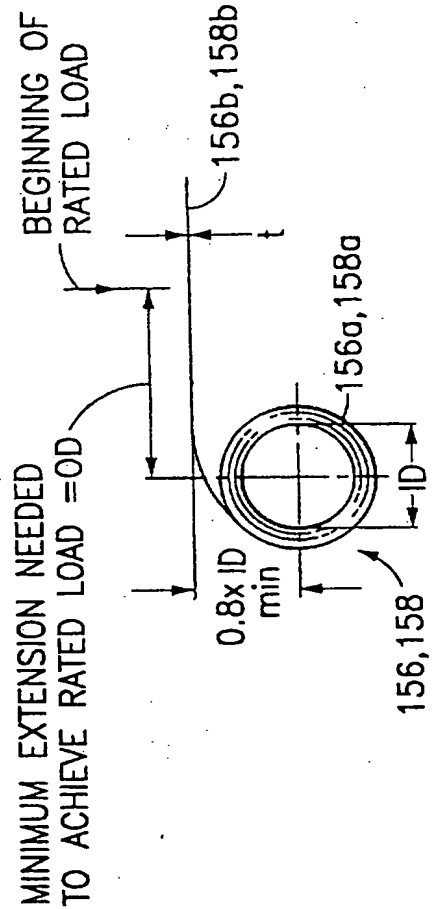


FIG. 5

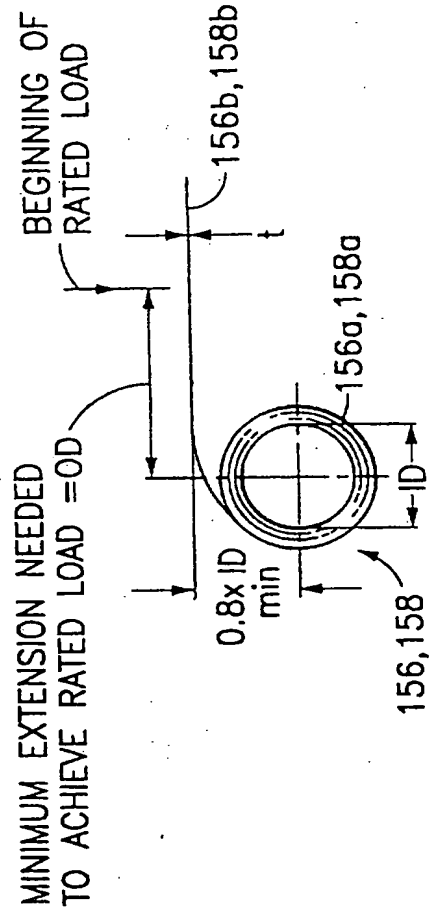


FIG. 6



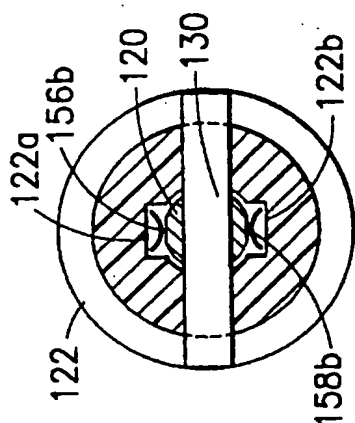
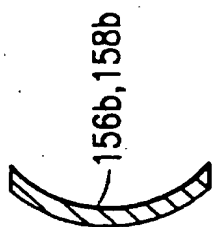
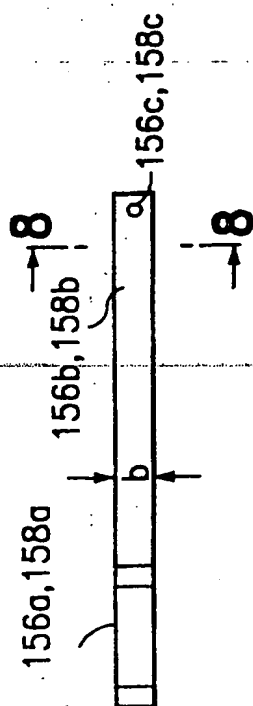


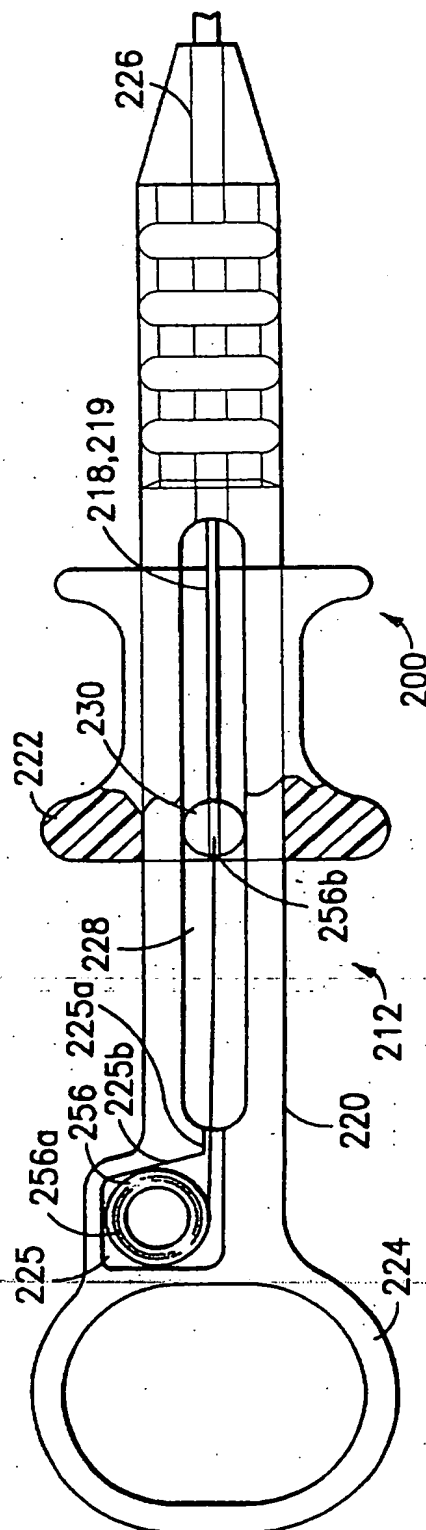
Fig. 9.



**FIG. 8.**



**FIG. 7**



**FIG. 10**

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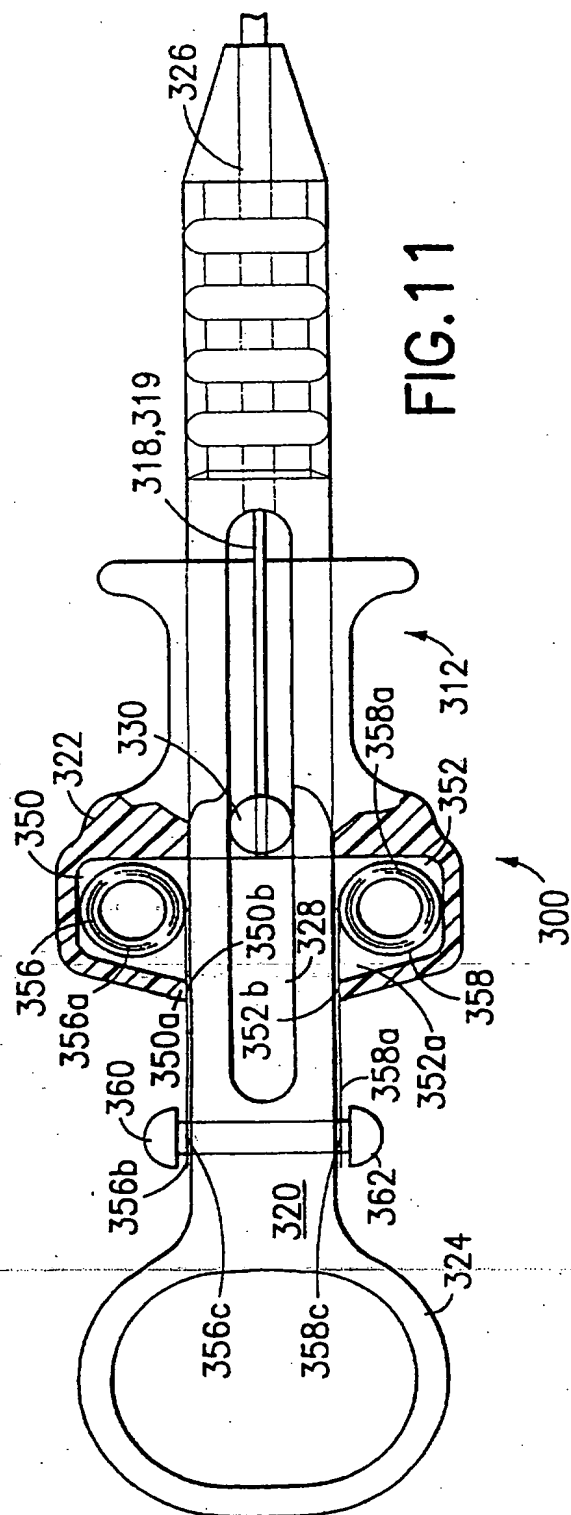


FIG. 11

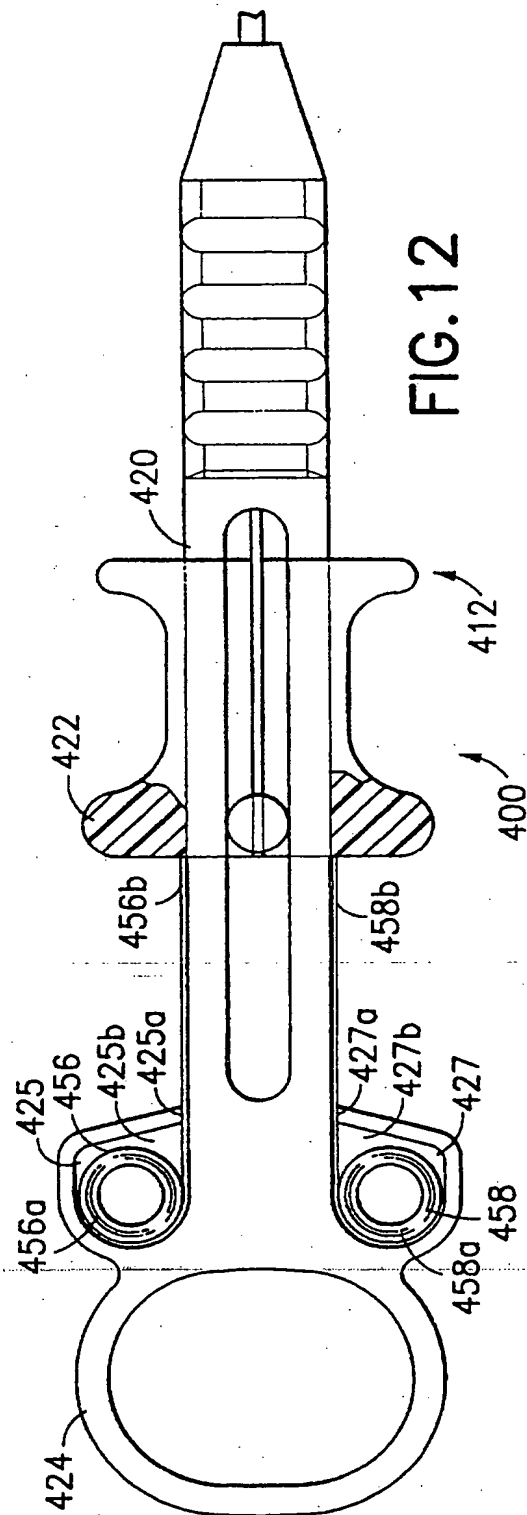


FIG. 12

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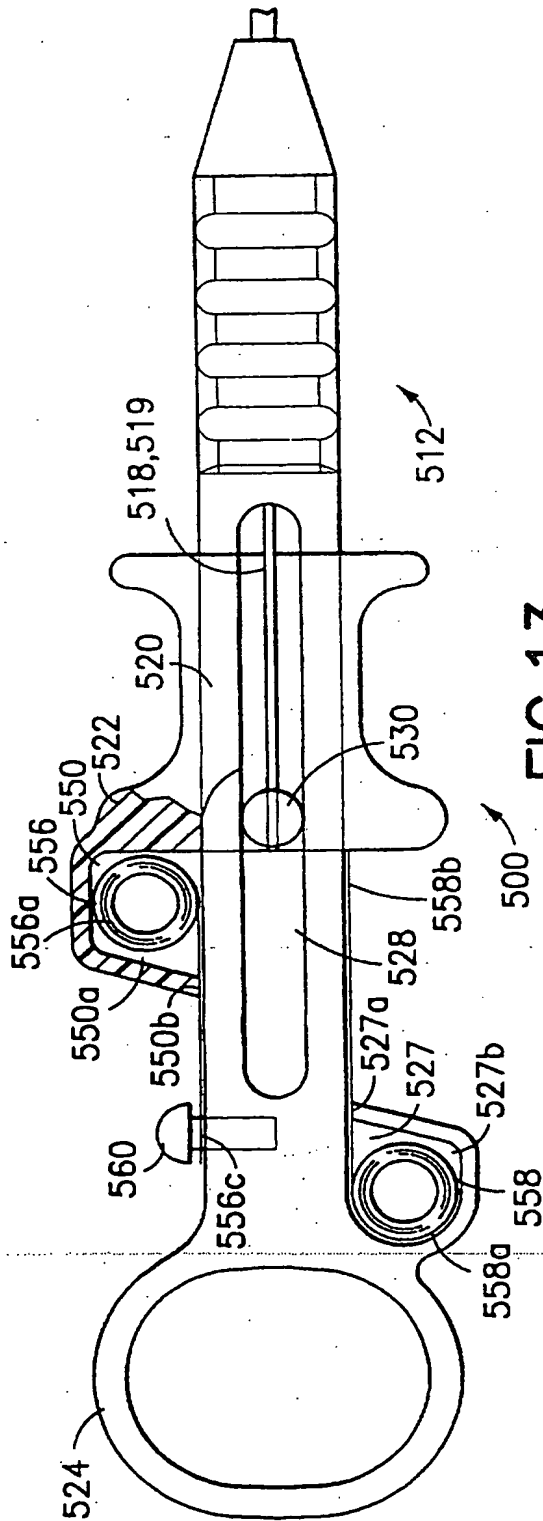


FIG. 13

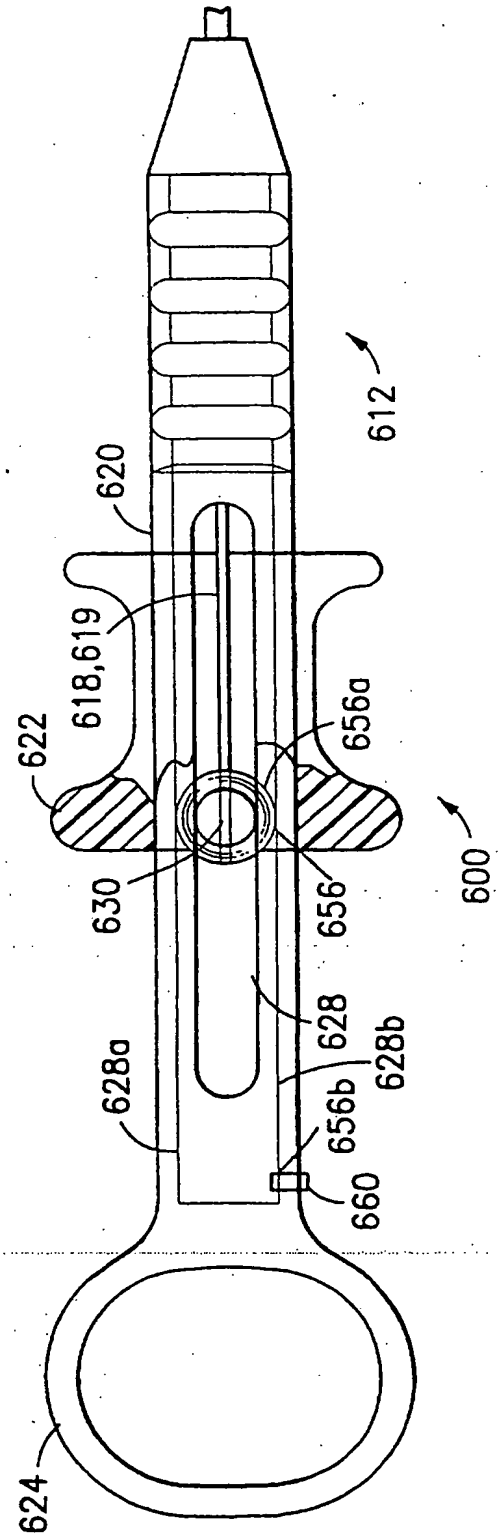


FIG. 14

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